



Origin & History, Symptoms and Preventive Measures of Eye Flu (Viral Conjunctivitis): A Review

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ABSTRACT

One of the most typical causes of red eyes, conjunctivitis strikes people of all ages and socioeconomic backgrounds. The majority of infectious conjunctivitis cases, up to 75% of them, are caused by viral conjunctivitis. The present review was based on the literature survey on the origin, history and preventive measures of viral conjunctivitis (eye flu). According to estimates, conjunctivitis accounts for 1% of primary care physician visits in the United States. In India, millions of patients were diagnosed with pink eye or viral conjunctivitis between June-August, 2023. It is frequently related to an allergic immunological reaction or a reaction to a foreign body. Whatever the cause, papillary conjunctivitis has the same histologic features: densely clustered, flat-topped projections with plenty of eosinophils, lymphocytes, plasma cells, and mast cells in the stroma encircling a central vascular channel. A sudden onset foreign body sensation, red eyes, itching, light sensitivity, burning, and watery discharge are symptoms of viral conjunctivitis in patients. Adenoviruses are the most frequent cause of viral conjunctivitis. The adenovirus is a double-stranded DNA virus that is not encapsulated and is a member of the Adenoviridae family. According to reports, the most recent isolated coronavirus strain, COVID-19, can also lead to conjunctivitis, fever, coughing, respiratory distress, and even death. The most serious conjunctivitis impersonators include cavernous carotid fistula, orbital cellulitis, and orbital haemorrhage. An improper connection between the arterial and venous circulation forms in cavernous carotid fistulas, which causes the venous system to dilate. In conclusion, steroids are effective in reducing the symptoms (redness, itching of eyes) but prolong the viral shedding and infection. Corticosteroids become more effective and potent when given with any antimicrobial agent in the eradication of adenoviral conjunctivitis (eye flu).

Keywords: Viral conjunctivitis, eye flu, pink eye, symptoms, management.

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INTRODUCTION

One of the most typical causes of red eyes, conjunctivitis strikes people of all ages and socioeconomic backgrounds. The majority of infectious conjunctivitis cases, up to 75% of them, are caused by viral conjunctivitis (pink eye). [1] Redness, blood vessel engorgement, ocular discharge, discomfort, photophobia, and pseudo-membranes are characteristics of viral conjunctivitis. The expenses of visits to the emergency room or general practitioner, diagnostic testing, prescription medication, and time missed from work or school have a significant economic and societal impact. One of the biggest expenses for any healthcare system is the prescription of antibiotics for viral conjunctivitis. Viral and bacterial infections are the two most frequent infectious causes. Other cold-related symptoms could also coexist with the viral infection. Cases of germs and viruses can spread quickly among individuals. Pollen or animal hair allergies are additional prevalent causes. Symptoms and indicators are frequently used to make a diagnosis. Occasionally, a discharge sample is sent for culture.

In the US, 3 to 6 million people experience acute conjunctivitis annually. Viral causes are more frequent in adults, whilst bacterial reasons are more frequent in youngsters. People usually recover in a week or two. Additional diagnosis and treatment may be necessary if symptoms persist after a week or if they are accompanied by evidence of herpes, vision loss, severe pain, light sensitivity, or other symptoms. Neonatal conjunctivitis, often known as conjunctivitis in newborns, may also need particular care.[2]

Origin and History

Acute haemorrhagic conjunctivitis is a highly contagious disease caused by one of two enteroviruses, enterovirus 70 and coxsackievirus A24. These were first identified in an outbreak in Ghana in 1969, and have spread worldwide since then, causing several epidemics. In the United Kingdom, between 80% and 95% of individuals with infectious conjunctivitis receive community-based antibiotic treatment.[3][4] Improvements in viral conjunctivitis diagnosis rates are thought to have decreased the unnecessary prescribing of antibiotics and saved the US \$430 million annually.



Fig 1. Illustration of viral conjunctivitis (eye flu)

Clinical trials are presently evaluating particular viral conjunctivitis therapies. A detailed medical and ocular history as well as a clinical examination should be obtained due to the non-specificity of the signs and symptoms, especially in patients with unusual signs and a chronic course.

Epidemiology

Whether bacterial or viral, conjunctivitis is a frequent issue that millions of Americans experience every year. According to estimates, conjunctivitis accounts for 1% of primary care physician visits in the United States. In India, millions of patients were diagnosed with pink eye or viral conjunctivitis between June-August, 2023. While bacterial conjunctivitis is the second most common cause of conjunctivitis, viral conjunctivitis is the most frequent cause, and it can be difficult for primary care doctors to tell the two apart. Medicines are frequently prescribed without a solid reason, which could place an extra financial burden on the patient and increase the number of bacteria that are resistant to medicines. Employers and educational institutions frequently demand that people with conjunctivitis stay away from their facilities until the infection has cleared up, potentially increasing the financial burden on individuals who are afflicted.[5]

Pathophysiology

Regardless of the origin, papillary or follicular conjunctivitis is the most common kind. Both categories are not pathognomonic for a specific disease entity. A cobblestone pattern of flattened nodules with central vascular centres is the result of papillary conjunctivitis. It is frequently related to an allergic immunological reaction or a reaction to a foreign body. Whatever the cause, papillary conjunctivitis has the same histologic features: densely clustered, flat-topped projections with plenty of eosinophils, lymphocytes, plasma cells, and mast cells in the stroma encircling a central vascular channel.

Inflammation brought on by pathogens including viruses, bacteria, chemicals, and topical medicines can also cause follicular conjunctivitis. Follicles are tiny, dome-shaped nodules without a noticeable central vessel, in contrast to papillae. A lymphoid follicle has a germinal core filled with immature, proliferating lymphocytes that is surrounded by a ring of mature lymphocytes and plasma cells histologically. It is found in the subepithelial region. The inferior palpebral and forniceal conjunctiva are frequently where follicles in follicular conjunctivitis are most noticeable.[6]

Signs and symptoms

A sudden onset foreign body sensation, red eyes, itching, light sensitivity, burning, and watery discharge are symptoms of viral conjunctivitis in patients. In contrast, patients with bacterial conjunctivitis present with all of the aforementioned symptoms in addition to mucopurulent discharge and matting of the eyelids. A recent history of an upper respiratory illness or recent interaction with a sick person is typical in patients who present with viral conjunctivitis. Their baseline vision is often where their visual acuity is. Subepithelial infiltrates in the cornea can impair vision and increase light sensitivity. Conjunctiva injection causes it to get red and become edematous. A membrane or pseudo-membrane can occasionally be seen in the tarsal conjunctiva. There are no lymphatic or blood arteries in

these sheets of fibrin-rich exudates. The removal of true membranes can cause significant bleeding and the development of symblepharon and subepithelial fibrosis.[7] On the palpebral conjunctiva, follicles, small, dome-shaped nodules without a noticeable core vessel, can be detected. Follicles will be present in the majority of patients with viral conjunctivitis, although the presence of papillae does not always rule out a viral cause.[8] A reactive lymph node that is tender to the touch can be found by palpating the preauricular lymph nodes, which can assist distinguish between bacterial and viral conjunctivitis. Vesicles may develop on the cheeks or eyelids with HSV, and vision may be impacted. There could be corneal involvement. Vesicles with herpes zoster have a linear dermatomal pattern. The conjunctiva is frequently red and discharges mucopurulent material.

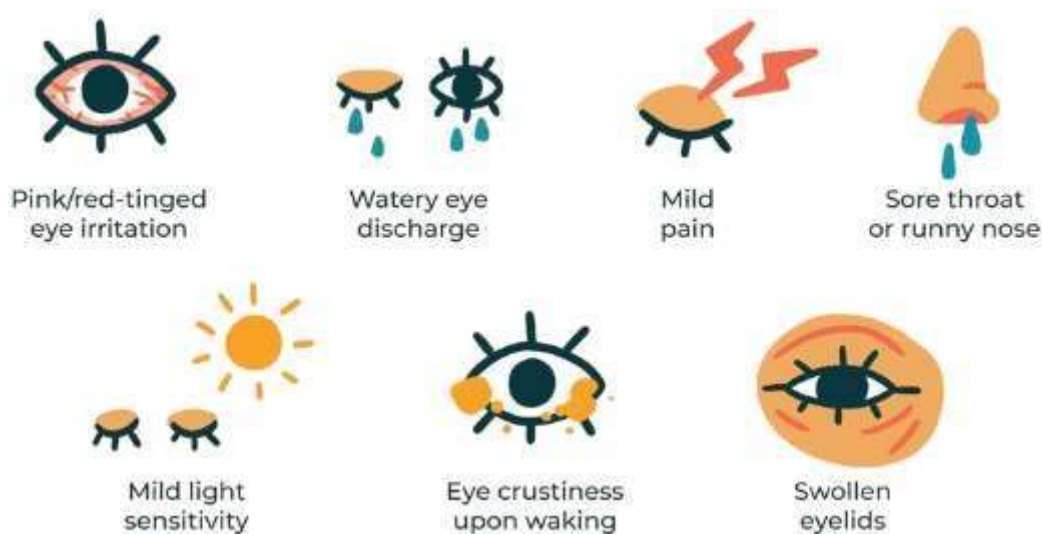


Fig 2. Signs and symptoms of viral conjunctivitis (eye flu)

The appearance of swollen lymph nodes, fever, malaise, exhaustion, and other constitutional symptoms can help distinguish viral conjunctivitis from other causes. Serious eye disorders such as anterior uveitis, keratitis, and scleritis are linked to anisocoria and photophobia.[9] Conjunctivitis is often accompanied by systemic diseases such as granulomatosis with polyangiitis, graft versus host disease, Steven-Johnson syndrome, and ocular cicatricial pemphigoid. Skin and mucous membrane diseases such as acne rosacea, ichthyosis, and xeroderma pigmentosum are also associated with systemic diseases.

These are some complications of eye flu as follows:

- Punctate keratitis
- Bacterial superinfection
- Conjunctival scarring
- Corneal ulceration
- Chronic infection

Aetiology

The sclera, the white portion of the eye, is protected by a thin, semi-transparent membrane called the conjunctiva. The conjunctiva extends from the limbus of the cornea to the posterior surface of the eyelids and the sclera. The palpebral conjunctiva is the area on the back of the lids, and the bulbar conjunctiva is the region covering the scleral.

Adenoviruses are the most frequent cause of viral conjunctivitis. The adenovirus is a double-stranded DNA virus that is not encapsulated and is a member of the Adenoviridae family. Upper respiratory tract infections, eye infections, and diarrhoea in children are frequently accompanied diseases brought on by the adenovirus. Viral infections affect adults more frequently than they do children, who are more prone to bacterial illnesses. Direct contact with the virus, airborne transmission, and reservoirs like swimming pools are all ways to get viral conjunctivitis. [10][11]. For 10–14 days, viral conjunctivitis is extremely infectious in the majority of patients. The best way to avoid spreading the disease to others is by washing your hands and avoiding eye contact.

❖ Adenoviral Conjunctivitis

Adenoviruses are responsible for up to 90% of cases of viral conjunctivitis.[12] Pharyngitis, periauricular lymphadenopathy, and acute follicular conjunctivitis with fever are the symptoms of pharyngoconjunctival fever (PCF) in children caused by HAdV types 3, 4, and 7. The most serious adenovirus-related ocular infection, epidemic keratoconjunctivitis (EKC), is typically linked to serotypes 8, 19, and 37. Subepithelial infiltrates and superficial punctate keratopathy can result from viral replication in the anterior stroma and epithelium of the cornea.[13] Povidone-iodine 2% monotherapy is proven to help symptoms go away.[9] Phase 3 randomized controlled studies on additional povidone-iodine and corticosteroid combinations are currently being conducted. Subepithelial infiltrates can induce crippling visual disturbances, however tacrolimus and 1% or 2% cyclosporine A eye drops have been demonstrated to be effective treatments.[14][15][16]

❖ Herpetic Conjunctivitis

Follicular conjunctivitis is a common complication of herpes conjunctivitis in both adults and children. The prevalence of acute conjunctivitis caused by the herpes simplex virus (HSV) ranges from 1.3 to 4.8%, according to estimates.[17] The goal of topical antiviral therapy is to lessen virus shedding and keratitis development. By directly contacting eye or skin lesions or by inhaling infected aerosolized particles, varicella-zoster can induce conjunctivitis, especially when the first and second branches of the trigeminal nerve are affected.

❖ Acute Haemorrhagic Conjunctivitis (AHC)

The symptoms of this extremely contagious viral conjunctivitis include a feeling of a foreign substance, epiphora, edema of the eyelids, conjunctival chemosis, and subconjunctival bleeding. Only a small percentage of patients have systemic symptoms such weariness, fever, and limb discomfort. The main methods of transmission are hand-to-eye contact and fomites.[18] The suspected pathogens are picornaviruses EV70 and coxsackievirus A24 variant (CA24v).[19]

❖ COVID-19 Conjunctivitis

According to reports, the most recent isolated coronavirus strain, COVID-19, can also lead to conjunctivitis, fever, coughing, respiratory distress, and even death.[20] According to retrospective and prospective investigations, conjunctival swabs are positive in 2.5% of cases of COVID-19-related conjunctivitis, which affects 1% to 6% of patients.[21] Understanding of transmission through ocular tissues is lacking. Due to their close proximity to patients, equipment-intensive clinics, close contact with patients' conjunctival mucosal surfaces, and high clinic volume, ophthalmologists are more likely to contract COVID-19 infection. Through direct or aerial inhalation of respiratory droplets, systemic COVID-19 can be acquired.

Diagnosis

Unless the infection persists for longer than 4 weeks and the symptoms do not improve, laboratory testing is often not necessary. Instances like a newborn with a probable chlamydial infection, an immunocompromised patient, a lot of discharge, or a possible gonorrhoea co-infection might all call for laboratory testing. Adenovirus can be positively identified in the office with tests that have a specificity and sensitivity of 89% and 94%, respectively. Ophthalmologists may typically make the diagnosis through clinical examination and confirmational further tests, though.[22]

Cell culture has historically been the gold standard for adenovirus testing because, if the virus is isolated, the diagnosis is certain and the virus can be characterised.[23] Cost and added time involved with cell culture-based testing are drawbacks. Polymerase chain reaction (PCR)-based viral DNA identification is the cornerstone of viral conjunctivitis testing in industrialized nations. Similar values were discovered for the diagnosis of HSV, while PCR for adenovirus has been proven to be 93% sensitive and 97.3% specific from conjunctival swabs.[24] The discovery of the AdenoPlus assay by Rapid Pathogen Screening Inc., Sarasota, Florida, USA, is a recent advancement in the field of rapid detection testing for adenovirus. This quick office test can identify 53 different viral serotypes and returns a result in only 10 minutes.[25] Studies have shown that adenoviral conjunctivitis can be detected with high specificity values of 92% to 98%. [26][27][28] In contrast to PCR analysis, the test is reported to have poorer sensitivity. Once viral conjunctivitis medications are available in the therapeutic context, rapid detection tests may be more beneficial in the future.

If any of these illnesses are suspected, a systemic workup should be started. The most serious conjunctivitis impersonators include cavernous carotid fistula, orbital cellulitis, and orbital hemorrhage. An improper connection between the arterial and venous circulation forms in cavernous carotid fistulas, which causes the venous system to dilate. The resultant hemorrhage and fistula rupture could result in death or irreparable eye damage. The ophthalmic vein enlarges as a result of venostasis, congesting the episcleral veins to give the appearance of conjunctivitis. A fistula and conjunctivitis can be distinguished from one another using proptosis and a pulsatile globe. A posterior to the septum infection that affects the contents of the orbit is called orbital cellulitis. In addition to conjunctivitis symptoms, patients may also experience pain during eye movement or even restricted eye movement. And last, an orbital hemorrhage is an urgent eye condition. The most common cause is

trauma, however there is a chance of a spontaneous bleed, especially in people taking anticoagulants and exhibiting proptosis, tight eyelids, and conjunctival erythema.

Preventive measures

- Never touch your eyes without reason: Never contact your eyes without reason. Throughout the day, be careful not to touch your face without a reason.
- Use artificial tears: Using artificial tears can help prevent dry eyes and other eye problems.
- Following general hygiene precautions is advised. When returning from outside, wash your hands. Try to keep distance from any members of your family who have the eye flu, he advised.
- Use dark goggles, avoid swimming, avoid close contact with others, and don't touch your eyes," he advised. Children should also skip a few days of school to prevent the conjunctivitis from spreading to other classmates.
- Stay away from crowded areas and refrain from touching commonplace items like railings or handles.
- Strict cleanliness standards must be upheld in order to lower the danger of conjunctivitis transmission.

Management of Viral Conjunctivitis

To enhance patient comfort and avoid any scar formation, a membrane or pseudo-membrane that is present can be peeled at the slit lamp. With a jeweler's forceps or a cotton swab dipped in topical anesthetic, these membranes can be peeled. Steroids applied topically can aid in the relief of symptoms. However, they may also lengthen the time that the virus is excreted. Patients should be made aware that they should avoid going to work or school until their symptoms go away because they are very contagious. While using steroids, they may continue shed the virus even though there are no outward signs of an infection. Patients who have reduced vision as a result of subepithelial infiltrates or severe conjunctival infections that cause greater discomfort than is normal should only get steroids.[29][30]

Unspecific disinfectant povidone-iodine is a promising therapeutic treatment for adenoviral conjunctivitis.[31] This antiseptic solution, which is affordable and readily accessible, is utilized as part of the aseptic setup for ocular surgery. Although it can kill external organisms, it has no impact on intracellular organisms. Due to the fact that its mode of action is not immunologically dependent, it does not cause drug resistance. Infants with adenoviral conjunctivitis who received a single dosage of 2.5% povidone-iodine experienced less severe symptoms and a quicker recovery without experiencing any unfavourable side effects.[32]

Epithelial herpes simplex keratitis contraindicates the use of topical corticosteroids alone because they prolong viral shedding and infection. Corticosteroids have shown high tolerance and efficacy in treating the inflammatory and infectious components of conjunctivitis when combined with an anti-infective.[33][34]

CONCLUSION

Patients must be made aware that their disease is harmless and will go away on its own. Given how contagious the virus is, hand washing should be promoted. To stop epidemics,

parents, children, and teachers should all get education on the value of isolation in the classroom. Contact lens wearers with viral conjunctivitis should be advised not to put them on until the symptoms have passed.

To stop the conjunctivitis from spreading to other patients, the emergency room needs a dedicated space for those who present with the condition. The doors should have notices about not shaking hands and cleaning hands whenever possible. To prevent contact with other patients after being seen, the patient must be personally escorted out of the clinic. When patients in the emergency room contracted conjunctivitis from infected people seated in the same area, numerous lawsuits followed.

In conclusion, steroids are effective in reducing the symptoms (redness, itching of eyes) but prolong the viral shedding and infection. Corticosteroids become more effective and potent when given with any antimicrobial agent in the eradication of adenoviral conjunctivitis (eye flu).

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CONFLICT OF INTEREST

Authors have confirmed for none conflict of interest.

AUTHORS CONTRIBUTION

All the authors were equally contributed in the literature survey and writing of this review paper.

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